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10/713,258	11/17/2003	Tae-Wan Kim	249/410	4771

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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/713,258	KIM ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-7, 10-15, and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Wolfgang Ehrfeld (WO 01/43857)[1]. Ehrfeld teaches a gas injection apparatus (Figure 1a-c, 2a-c) for injecting a reactive gas into a reaction chamber (inside surface of 1, Figure 2a,b) of a semiconductor processing system (abstract, "chemical reactions"), the apparatus comprising: an injector (2,3, Figure 2a,b) disposed to contact an inner surface of a wall of the reaction chamber (inside surface of 1, Figure 2a,b) of the semiconductor processing system (abstract, "chemical reactions"), the injector (2,3, Figure 2a,b) having a plurality of nozzles (5, Figure 2a,b) penetrating it, through which the reactive gas is injected into the reaction chamber (inside surface of 1, Figure 2a,b); a gas inlet (4a,b, Figure 2a,b) penetrating through the wall of the reaction chamber (inside surface of 1, Figure 2a,b); a manifold ("bifurcations"; Abstract, not labelled, Figure 2a,b) disposed between the wall of the reaction chamber (inside surface of 1, Figure 2a,b) and the injector (2,3, Figure 2a,b), for supplying the reactive gas flowing through the gas inlet (4a,b, Figure 2a,b) to each of the plurality of nozzles (5, Figure 2a,b); and bifurcating gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) arranged on at least two levels (first "bifurcation" conduit; Abstract, not labelled, Figure 2a,b) in the manifold ("bifurcations"; Abstract, not labelled, Figure 2a,b), the at least two levels (first "bifurcation" conduit; Abstract, not labelled, Figure 2a,b) equalizing lengths of gas paths connecting the gas

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inlet (4a,b, Figure 2a,b) to the plurality of nozzles (5, Figure 2a,b), wherein all surfaces (surfaces constituting 5, 2/3, and 4a) defining the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) have a full extent defined by a surface of the injector (2,3, Figure 2a,b) and a surface of the reaction chamber (inside surface of 1, Figure 2a,b) as claimed by claim 1 – Applicant's claim requirement of "semiconductor processing system" is a claim requirement of intended use. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Ehrfeld further teaches:

i. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein one level of the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) of the at least two levels (first "bifurcation" conduit; Abstract, not labelled, Figure 2a,b) of gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) is split into two branches ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) at either end of the next higher level of the gas channel, each branch having the same length, the highest level of gas channel is split into two branches ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b), each having the same length at a portion connecting with the gas inlet (4a,b, Figure 2a,b), and each of the plurality of nozzles (5, Figure 2a,b) is connected

to the lowest level of the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b), as claimed by claim 2

ii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 2, wherein the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) are arranged on four levels (fourth "bifurcation" conduit; Abstract, not labelled, Figure 2a,b), as claimed by claim 3

iii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 2, wherein each of the plurality of nozzles (5, Figure 2a,b) is connected at either end of the lowest level of the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b), as claimed by claim 4

iv. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein a support structure (lower piece 1, Figure 2a,b) is formed in the inner surface of the wall of the reaction chamber (inside surface of 1, Figure 2a,b), and the injector (2,3, Figure 2a,b) is inserted into the support structure (lower piece 1, Figure 2a,b), as claimed by claim 5

v. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) are formed in the shape of a groove on the surface of the injector (2,3, Figure 2a,b) in contact with the inner surface of the wall of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 6

vi. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) are formed in the

shape of a groove on the inner surface of the wall of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 7

vii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein exits of the plurality of nozzles (5, Figure 2a,b) are evenly spaced on a surface of the injector (2,3, Figure 2a,b) opposite to an interior of the reaction chamber (inside surface of 1, Figure 2a,b), along a circumference of the injector (2,3, Figure 2a,b), as claimed by claim 10

viii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein the injector (2,3, Figure 2a,b) is flat and ring-shaped and disposed to contact the bottom (top of upper portion of 1) of an upper wall (1) of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 11

ix. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 11, wherein the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) are disposed so that a high-level gas channel (4a; Figure 2a,b) relative to the gas inlet (4a,b, Figure 2a,b) is closer to an outer circumference of the injector (2,3, Figure 2a,b) and a low-level gas channel (5; Figure 2a,b) relative to the gas inlet (4a,b, Figure 2a,b) is closer to an inner circumference of the injector (2,3, Figure 2a,b), as claimed by claim 12

x. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein the injector (2,3, Figure 2a,b) is cylindrical and disposed to contact an inner surface of a sidewall of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 13

xi. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 12, wherein the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) are disposed on the outer circumference of the injector (2,3, Figure 2a,b) so that a high-level gas channel (4a;

Figure 2a,b) relative to the gas inlet (4a,b, Figure 2a,b) is lower in the reaction chamber (inside surface of 1, Figure 2a,b) than a low-level gas channel (5; Figure 2a,b) relative to the gas inlet (4a,b, Figure 2a,b), as claimed by claim 14

xii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 14, wherein the injector (2,3, Figure 2a,b) is supported by a support member (upper portion of lower piece 1; Figure 2a) in the wall of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 17

xiii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, further comprising a showerhead type injector (6, Figure 2a,b) disposed at the top of the reaction chamber (inside surface of 1, Figure 2a,b), the showerhead type injector (6, Figure 2a,b) supplying the reactive gas towards a center of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 18

xiv. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein two or more reactive gases are mixed when passing through the manifold ("bifurcations"; Abstract, not labelled, Figure 2a,b), and a mixture of the two or more reactive gases are injected into the reaction chamber (inside surface of 1, Figure 2a,b) through the plurality of nozzles (5, Figure 2a,b), as claimed by claim 19. Applicant's claim requirement of "wherein two or more reactive gases are mixed when passing through the manifold" is a claim requirement of intended use. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference

between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 8, 9, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wolfgang Ehrfeld (WO 01/43857)[2] in view of Os; Ron van et al. (US 6,001,267 A). Ehrfeld is discussed above. Ehrfeld is confirmed by the USPTO translations branch on August 2, 2005 that Ehrfeld is silent with respect to the material of Ehrfeld's injector (2,3, Figure 2a,b) as claimed in claim 8 and 9:

i. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 7, wherein the injector (2,3, Figure 2a,b) is formed of a dielectric liner, as claimed by claim 8

ii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 8, wherein the dielectric liner is formed of a ceramic material, as claimed by claim 9

Ehrfeld further does not teach:

i. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein the injector (2,3, Figure 2a,b) is conical and disposed to contact a sloped inner surface of an upper wall of the reaction chamber (inside surface of 1, Figure 2a,b), as claimed by claim 15

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ii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 15, wherein the gas channels ("bifurcations" conduits; Abstract, not labelled, Figure 2a,b) are disposed on the outer circumference of the injector (2,3, Figure 2a,b) so that a high-level gas channel (4a; Figure 2a,b) relative to the gas inlet (4a,b, Figure 2a,b) is located lower in the reaction chamber (inside surface of 1, Figure 2a,b) than a low-level gas channel (5; Figure 2a,b) relative to the gas inlet (4a,b, Figure 2a,b), as claimed by claim 16

iii. The gas injection apparatus (Figure 1a-c, 2a-c) as claimed in claim 1, wherein the reaction chamber (inside surface of 1, Figure 2a,b) includes a plasma source or magnetron gun, as claimed by claim 20

Os teaches a plasma processing apparatus (Figure 2; column 4; lines 32-65) including:

iv. The gas injection apparatus (Figure 2,3; column 4, lines 32-65) as claimed in claim 1, wherein the injector (40, Figure 4) is conical and disposed to contact a sloped inner surface of an upper wall (piece between 28b and 16; Figure 2) of the reaction chamber (16, Figure 2), as claimed by claim 15

v. The gas injection apparatus (Figure 2,3; column 4, lines 32-65) as claimed in claim 15, wherein the gas channels (46,48; Figure 4) are disposed on the outer circumference of the injector (40, Figure 4) so that a high-level gas channel (48; Figure 4) relative to the gas inlet (58, Figure 4) is located lower in the reaction chamber (16, Figure 2,4) than a low-level gas channel (46; Figure 4) relative to the gas inlet (58, Figure 4), as claimed by claim 16

vi. The gas injection apparatus (Figure 2,3; column 4, lines 32-65) as claimed in claim 1, wherein the reaction chamber (16, Figure 2) includes a plasma source (11; Figure 2; column 3, lines 30-45) or magnetron gun, as claimed by claim 20

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form Ehrfeld's injector (2,3, Figure 2a,b) into a conical shape made from ceramic material as taught by Os, and to add Os's plasma source as taught by Os.

Motivation to form Ehrfeld's injector (2,3, Figure 2a,b) into a conical shape made from ceramic material as taught by Os, and to add Os's plasma source as taught by Os is for unifrom plasma assited depositions on integrated circuits (column 1; lines 8-15) using plasma compliant materials as taught by Os (column 4; lines 45-51).

Response to Arguments

5. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new grounds of rejection.

Conclusion

6. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.